

## Section 0-8: Systems of Equations

By the end of this lesson, you should be able to answer:

- How do you use graphing, substitution, and elimination to solve systems of linear equations?

Define the following:

1. System of Equations

2. Substitution

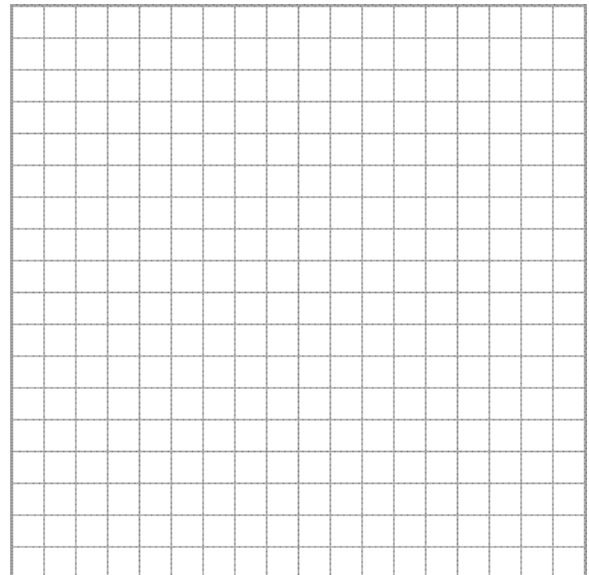
3. Elimination

There will be times when groupings of variables will be in equations that need to be solved at the same time. This situation is when systems of equations come around. There are three ways we will look at solving them: graphing, substitution, and elimination.

When solving a system of linear equations, we are looking for the point where the two lines intersect. You will see either one solution (one point), no solutions (parallel lines), or an infinite number of solutions on the line (same line).

*Example 1:* Solve the system of equations by graphing.

$$\begin{cases} y = 2x - 4 \\ y = -x + 5 \end{cases}$$



**Steps for solving by substitution:**

*Example 2:* Solve by substitution.

$$\begin{cases} x + y = 9 \\ 10x + y = 12x \end{cases}$$

**Steps for solving by elimination:**

*Example 3:* Solve by elimination.

$$\begin{cases} 7x + 2y = 5 \\ 2x + 3y = 16 \end{cases}$$

*Example 4: Solve.*

a. 
$$\begin{cases} x - 2y = 7 \\ -2x + 4y = -14 \end{cases}$$

b. 
$$\begin{cases} 2x - 7y = -2 \\ -4x + 14y = 3 \end{cases}$$

When solving a system, you will know the following:

There is one solution when:

There is no solution when:

There are infinite solutions on the line when:

Problem Set:

"I have failed many times, and that's why I am a success."  
- Michael Jordan